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NOTEBOOK IoT DEVICE WITH DATA CACHING

HP INC

Notebook IoT Device with Data Caching

Abstract

For battery powered IoT devices when the battery is exhausted the remote systems are not able to communicate with the device. Store and forward can be used by the server to store the pending commands for an IoT device and once it is attached to the network and connected to the server, then deliver the pending commands. However, for time sensitive or security related commands the time between when the IoT device is powered, connected to the server, and commands delivered creates additional risks for the IoT device. This caching solution allows for commands to be cached coming into the IoT radio even when the system itself is no longer powered. In addition, certain status coming out of the system can be cached at the modem during times when the system itself may no longer have any battery power, but the radio is able to now able to re-connect to the network and provide some updated host status.

Typically for IoT devices the host system consumes much more power than the IoT modem. This approach would allow for reserve power to keep only the IoT modem powered even when the host itself is no longer powered.

This type of reserve battery solution, where IoT device is able to maintain power for a longer duration then the system, would allow for a remote management system to continue to deliver time sensitive/secure commands to the IoT modem. The IoT modem, which would still be powered, would then be able to cache the commands that it receives, and then hand them off to the host once the system returns to a powered state. The advantage here is that the system could receive time critical commands even when it is no longer powered and does not have sufficient battery power to operate. However, once the system gains sufficient power (for example is subsequently plugged into AC), these cached commands could then be provided to the host system and be able to be acted upon as soon as host power is once again restored. This is extremely critical for security type features, where updates and/or security patches may need to be provided before system itself fully boots.

This same solution can also be applied in the reverse direction as well. For example, if the IoT modem is not connected to the network, then the IoT modem can be used by the system to cache specific status messages from the host. Such that even if the host subsequently loses power, the cached status could still be stored on the radio. Once the system enters a location where connectivity is once again restored, the last known status of the device could then be handed off to the remote management solution. This feature could be accomplished even if the host is no longer able to be powered and operate on its own.

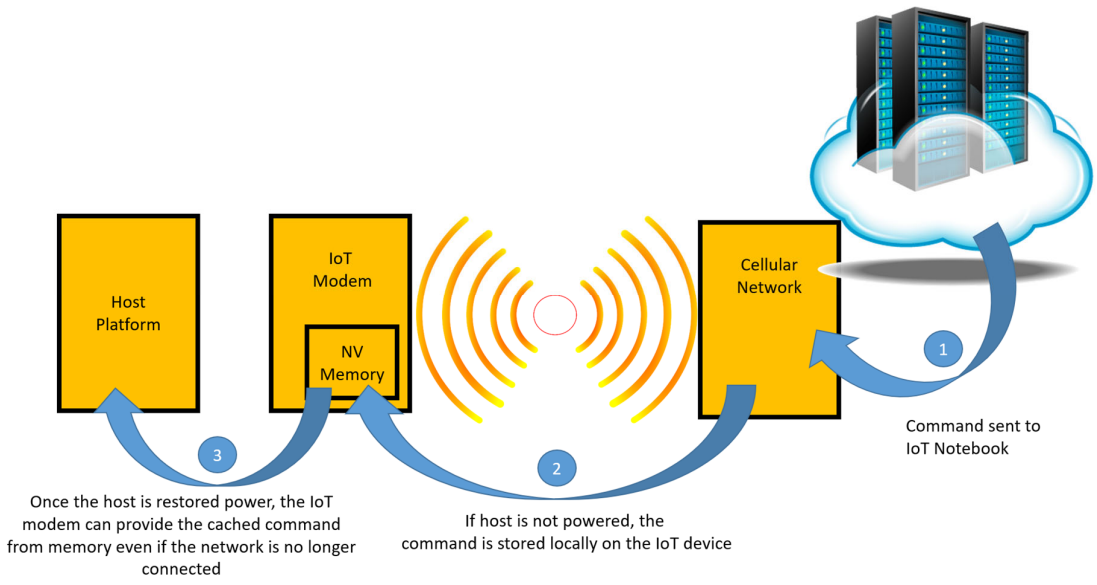

Figure 1: A block diagram showing the basic flow of a message cached on the IoT modem even if the system is asleep at the time.

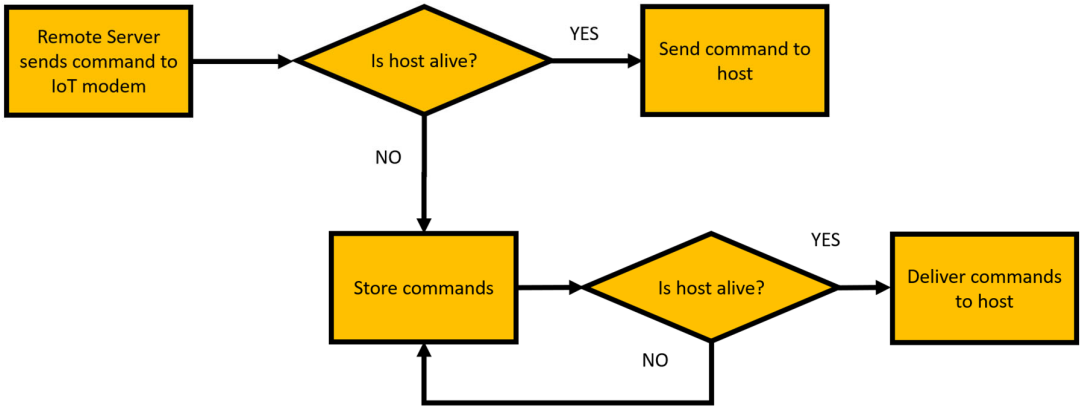

Figure 2: A flow chart illustrating how a message can be cached on the IoT modem waiting for the host system to become powered once again.

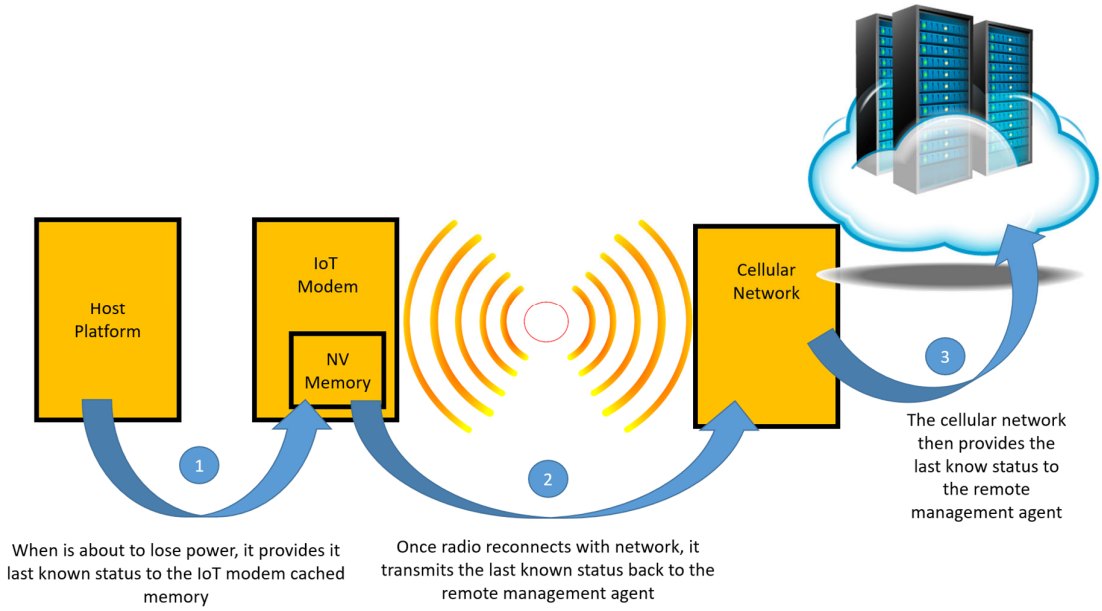

Figure 3: A block diagram showing the basic flow of a message that is cached onto the IoT modem, waiting for the network re-connection to transmit, even if the system is no longer powered at the time.

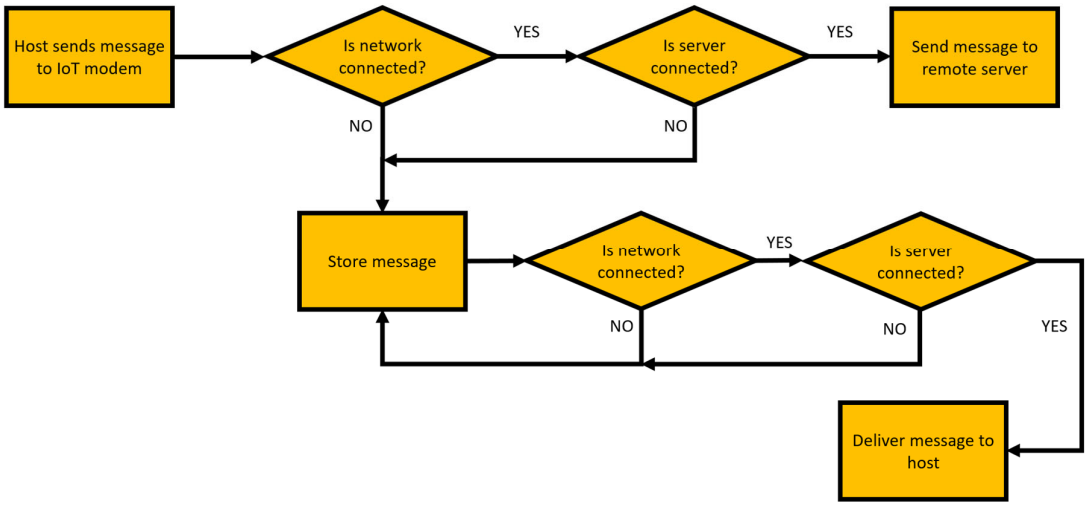

Figure 4: A flow chart illustrating how a message can be cached on the IoT modem waiting for the network connection to be re-established, even if the host is no longer powered.

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